

WHAT IS CLAIMED IS:

1. An organic light-emitting diode (OLED) display system having addressable pixels on a substrate, the pixels having performance attributes, and a control circuit for controlling the pixels of the display device, comprising:

- a) one or more OLED pixels;
- b) an OLED reference pixel located on a substrate and connected to the control circuit, the OLED reference pixel having the same performance attributes as the one or more OLED pixels, the OLED reference pixel having a voltage sensing circuit including a transistor connected to one of the terminals of the OLED reference pixel for sensing the voltage across the OLED reference pixel to produce a voltage signal representing the voltage across the OLED reference pixel;
- c) a measurement circuit connected to the voltage signal to produce an output signal representative of the performance attributes of the OLED reference pixel;
- d) an analysis circuit connected to the measurement circuit to receive the output signal, compare the performance attributes with predetermined performance attributes, and produce a feedback signal in response thereto; and
- e) the control circuit being responsive to the feedback signal to compensate for changes in the output of the OLED pixels.

2. The OLED display system claimed in Claim 1, wherein the output of the OLED pixels changes with temperature, and further comprising a temperature sensor for generating a temperature signal and wherein the control circuit is also responsive to the temperature signal to calculate the correction signal.

3. The OLED display system claimed in Claim 1, wherein the control circuit further includes a lookup table containing corrected control signals for controlling the pixels of the display.

4. The OLED display system claimed in Claim 1, further comprising a plurality of OLED reference pixels and measurement circuits connected to the analysis circuit.
5. The OLED display system claimed in Claim 4, wherein the OLED display includes different types of OLED pixels having different performance attributes and the OLED reference pixels include a pixel of each of the different type.
6. The OLED display system claimed in Claim 5, wherein the types of OLED pixels include OLED pixels of different colors.
7. The OLED display system claimed in Claim 4, wherein the OLED reference pixels include multiple identical OLED reference pixels whose results are combined whereby the measured performance attribute is more accurately measured.
8. The OLED display system claimed in Claim 1, wherein the analysis circuit compares the OLED reference pixel performance attributes to a model of OLED pixel behavior.
9. The OLED display system claimed in Claim 1, wherein the analysis circuit compares the OLED reference pixel attributes to empirical data relating to the performance of an exemplary OLED display.
10. The OLED display system claimed in Claim 1, wherein the analysis device compares the OLED reference pixel attributes to historical OLED reference pixel attribute data.

11. The OLED display system claimed in Claim 1, wherein the measurement circuit is integrated on the same substrate as the OLED reference pixel.
12. The OLED display system claimed in Claim 1, wherein the analysis circuit is integrated on the same substrate as the OLED reference pixel.
13. The OLED display system claimed in Claim 1, wherein the feedback control circuit is integrated on the same substrate as the OLED reference pixel.
14. The OLED display system claimed in claim 1, wherein the OLED reference pixel is also a OLED pixel.
15. The OLED display system claimed in claim 1, wherein the control circuit controls the voltage applied to the entire display device.
16. The OLED display system claimed in claim 1, wherein the control circuit controls the voltage applied to groups of OLED pixels on the OLED display.
17. The OLED display system claimed in claim 1, wherein the control circuit modifies a response to code values used to represent OLED pixel brightness.
18. The OLED display system claimed in claim 1, wherein the control circuit controls the time that voltage or charge is applied to the OLED pixels in the OLED display.
19. A method for controlling an OLED display device having addressable OLED pixels on a substrate, the OLED pixels having performance

attributes, and a control circuit for controlling the OLED pixels of the OLED display, comprising the steps of:

- a) providing one or more OLED pixels;
- b) providing an OLED reference pixel located on a substrate and connected to the control circuit, the OLED reference pixel having the same performance attributes as the one or more OLED pixels, the OLED reference pixel having a voltage sensing circuit including a transistor connected to one of the terminals of the OLED reference pixel for sensing the voltage across the OLED reference pixel to produce a voltage signal representing the voltage across the OLED reference pixel;
- c) measuring the voltage signal to produce an output signal representative of the performance attributes of the OLED reference pixel;
- d) receiving the output signal, comparing the performance attributes with predetermined performance attributes, and producing a feedback signal in response thereto; and
- e) controlling the OLED display in response to the feedback signal by calculating a corrected control signal for controlling the OLED pixels and employing the corrected control signal to control the OLED pixels to thereby compensate for the changes in the output of the OLED pixels.

20. The method claimed in Claim 19, further comprising the steps of providing a plurality of OLED reference pixels and measuring the outputs thereof.

21. The method claimed in Claim 20, wherein the OLED display includes different types of OLED pixels having different performance attributes and the OLED reference pixels include a pixel of each different type.

22. The method claimed in Claim 19, wherein the types of OLED pixels include pixels of different colors.

23. The method claimed in Claim 19, wherein the OLED reference pixels include multiple identical pixels whose results are combined whereby the measured performance attribute is more accurately measured.

24. The method claimed in Claim 19, wherein the analyzing step includes comparing the OLED reference pixel performance attributes to a model of OLED pixel behavior.

25. The method claimed in Claim 19, wherein the analyzing step includes comparing the OLED reference pixel attributes to empirical data relating to the performance of an exemplary OLED display.

26. The method claimed in Claim 19, wherein the analyzing step includes comparing the OLED reference pixel attributes to historical reference OLED pixel attribute data.

27. The method claimed in Claim 19, wherein the measuring step is performed with a measuring circuit that is integrated on the same substrate as the OLED reference pixel.

28. The method claimed in Claim 19, wherein the analyzing step is performed with an analysis circuit that is integrated on the substrate.

29. The method claimed in Claim 19, wherein the controlling step is performed by a control circuit that is integrated on the substrate.

30. The method claimed in claim 19, wherein the OLED reference pixel is also an OLED pixel.

31. The method claimed in claim 19, wherein the controlling step includes controlling the voltage applied to the entire OLED display.

32. The method claimed in claim 19, wherein the controlling step includes controlling the voltage applied to groups of OLED pixels on the OLED display.

33. The method claimed in claim 19, wherein the controlling step includes modifying the response to code values used to represent OLED pixel brightness.

34. The method claimed in claim 19, wherein the controlling step includes controlling the time that voltage or charge is applied to the OLED pixels in the OLED display.